



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/724,747	12/02/2003	Nobuo Yodoshi	07057.0058	2091
22852	7590	10/29/2007	EXAMINER	
FINNEGAN, HENDERSON, FARABOW, GARRETT & DUNNER LLP 901 NEW YORK AVENUE, NW WASHINGTON, DC 20001-4413			HAILEY, PATRICIA L	
		ART UNIT	PAPER NUMBER	
		1793		
		MAIL DATE	DELIVERY MODE	
		10/29/2007	PAPER	

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/724,747	YODOSHI, NOBUO	
	<b>Examiner</b>	<b>Art Unit</b>	
	Patricia L. Hailey	1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 17 August 2007.
- 2a) This action is FINAL.                  2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-6,8-14 and 16-23 is/are pending in the application.
  - 4a) Of the above claim(s) 23 is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1-6, 8-14, and 16-22 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.
 

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
    - a) All    b) Some \* c) None of:
      1. Certified copies of the priority documents have been received.
      2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
      3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date: _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>08/01/07</u>  | 6) <input type="checkbox"/> Other: _____                          |

Applicants' remarks and amendments, filed on August 17, 2007, have been carefully considered. Claims 7 and 15 have been canceled; no new claims have been added.

Claims 1-6, 8-14, and 16-23 remain pending in this application.

***Election/Restrictions***

1. Claim 23 remains withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected membrane electrode assembly, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on January 19, 2007.

Claims 1-6, 8-14, and 16-22 remain under consideration by the Examiner.

***Priority***

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Applicants' Priority Documents were filed on December 2, 2003.

***Withdrawn Objections and Rejections***

The objection to claims 3 and 4 for being in improper dependent form for failing to further limit the subject matter of a previous claim, stated in the previous Office Action, has been withdrawn in view of Applicants' amendments to these claims.

The 112(2) rejection of claims 17-22 for being indefinite for failing to particularly point out and distinctly claims the subject matter which Applicant regards as the invention, stated in the previous Office Action, has been withdrawn in view of Applicants' amendments to these claims.

The 102(b) rejection of claims 1-22 as being anticipated by Denton et al. (U. S. Patent No. 5,716,437), stated in the previous Office Action, has been withdrawn in view of Applicants' amendments to these claims.

The 102(e) rejection of claims 1-7, 9-15, and 17-22 as being anticipated by Sompalli et al. (U. S. Patent No. 6,524,736), stated in the previous Office Action, has been withdrawn in view of Applicants' amendments to these claims.

#### ***New Grounds of Rejection***

The following New Grounds of Rejection are being made in view of Applicants' amendments, and in view of the newly discovered reference to Freire et al. (U. S. Patent No. 5,891,318).

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

#### ***Claim Rejections - 35 USC § 112***

4. ***Claims 18, 19, 21, and 22 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.***

Claims 18, 19, 21, and 22 are indefinite because these claims recite limitations regarding impurities ("...and the impurities includes at least one of vanadium (V), iron (Fe), and nickel (Ni)."); there is no antecedent basis for these limitations. Claims 17 and 20, from which claims 18, 19, 21, and 22 depend, have been amended to delete the phrase "a low content of impurities that cause formation of".

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. ***Claims 1-6, 8-14, and 16-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Denton et al. (U. S. Patent No. 5,716,437) in view of Freire et al. (U. S. Patent No. 5,891,318).***

Denton et al. disclose an electrode comprising an ink comprising a mixture of one or more catalyst materials (selected from the platinum group metals, gold, silver or a

base metal or base metal oxide, or an alloy or mixture comprising one or more of these metals, preferably supported on a conductive substrate such as carbon, see col. 6, lines 13-21) and one or more proton-conducting polymers (considered to read upon the limitation "solvent" in **claim 1**), and a method of preparing said electrode by applying the ink to a substrate via a variety of methods, such as vacuum filtration deposition (considered to read upon the "filtration step" in, for example, **claim 8**, and therefore the "reducing step" in **claim 1**) or rolling. Denton et al. also disclose a membrane electrode assembly comprising one or more of said electrodes. See col. 6, lines 31-40 of Denton et al.

Denton et al. also disclose an MEA comprising a printing ink and a method for preparing the same, said method comprising applying said printing ink directly onto the surface of a polymer electrolyte membrane. See col. 7, lines 13-45 of Denton et al.

Because Denton et al. is silent regarding the presence of impurities in the catalyst ink, Applicants' claim limitations with respect to the "agglutinates" and to the "impurities that cause formation of agglutinates" is considered inherently encompassed by Denton et al.

Further, because Denton et al. do not recite the presence of "at least one of vanadium (V), iron (Fe), and nickel (Ni)", Applicants' claim limitations regarding these "impurities" and their respective amounts (i.e., **claims 18, 19, 21, and 22**) are also considered inherently encompassed by Denton et al. Additionally, Applicants' claim recitation "equal to or lower than" is considered to include amounts of zero (0) percent by weight.

Denton et al. do not teach or suggest that the reduction step includes "at least one of a crushing step and a disintegrating step", as presently claimed.

Freire et al. disclose that, in the production of an electrochemical cell (Figures 3 and 3A) electrochemically active material (comprising catalyst materials such as platinum, ruthenium, osmium, rhenium, rhodium, iridium, palladium, gold, titanium, tin or zirconium, as well as oxides, alloys, or mixtures thereof; see col. 8, lines 59-67 of Freire et al.) is conventionally incorporated in a coating formulation, or ink (which also comprises a binder polymer for binding the particles of the electrochemically active material together), is applied to a membrane. These particles, when coated with the binder polymer, have a tendency to agglomerate. By grinding the particles to a particularly small size, a better particle distribution may be obtained. See col. 10, lines 37-53 of Freire et al.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of Denton et al. by incorporating therein the step of grinding the catalyst particles, as suggested by Freire et al., to ensure a better particle distribution when the ink is applied to the membrane.

**8.     *Claims 1-6, 9-14, and 17-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sompalli et al. (U. S. Patent No. 6,524,736) in view of Freire et al. (U. S. Patent No. 5,891,318).***

Sompalli et al. teach a method of making a membrane electrode assembly by applying a catalyst slurry (often referred to as an ink, see col. 6, lines 50-53) to a porous substrate support (col. 6, lines 6-10).

The catalyst slurry comprises an ionomer, with particles of electrically conductive material, typically carbon, and particles of catalyst. The catalyst support is typically the electrically conductive material, and the catalyst is typically a metal. See col. 6, line 50 to col. 7, line 20 of Sompalli et al.

The catalyst slurry is spread on a porous substrate (e.g., PTFE) in one or more layers, and subsequently dried. The catalyst layers are then bonded to a polymer electrolyte membrane by hot-pressing. See col. 7, lines 21-67 of Sompalli et al., as well as col. 8, lines 1-20.

Because Sompalli et al. is silent regarding the presence of impurities in the catalyst ink, Applicants' claim limitations with respect to the "agglutinates" and to the "impurities that cause formation of agglutinates" is considered inherently encompassed by Sompalli et al.

Further, because Sompalli et al. do not recite the presence of "at least one of vanadium (V), iron (Fe), and nickel (Ni)", Applicants' claim limitations regarding these "impurities" and their respective amounts (i.e., **claims 18, 19, 21, and 22**) are also considered inherently encompassed by Sompalli et al. Additionally, Applicants' claim recitation "equal to or lower than" is considered to include amounts of zero (0) percent by weight.

Sompalli et al. do not teach or suggest that the reduction step includes "at least one of a crushing step and a disintegrating step", as presently claimed.

Freire et al. disclose that, in the production of an electrochemical cell (Figures 3 and 3A) electrochemically active material (comprising catalyst materials such as platinum, ruthenium, osmium, rhenium, rhodium, iridium, palladium, gold, titanium, tin or zirconium, as well as oxides, alloys, or mixtures thereof; see col. 8, lines 59-67 of Freire et al.) is conventionally incorporated in a coating formulation, or ink (which also comprises a binder polymer for binding the particles of the electrochemically active material together), is applied to a membrane. These particles, when coated with the binder polymer, have a tendency to agglomerate. By grinding the particles to a particularly small size, a better particle distribution may be obtained. See col. 10, lines 37-53 of Freire et al.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of Denton et al. by incorporating therein the step of grinding the catalyst particles, as suggested by Freire et al., to ensure a better particle distribution when the ink is applied to the membrane.

### ***Conclusion***

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.
10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

Art Unit: 1793

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Patricia L. Hailey whose telephone number is (571) 272-1369. The examiner can normally be reached on Mondays-Fridays, from 7:00 a.m. to 3:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jerry Lorengo, can be reached on (571) 272-1233. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group 1700 Receptionist, whose telephone number is (571) 272-1700.

Art Unit: 1793

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

*Patricia L. Hailey*  
Patricia L. Hailey/plh  
Examiner, Art Unit 1793  
October 25, 2007

*J.A. LORENZO*  
**SUPERVISORY PATENT EXAMINER**